

Medical emergencies in a rural district

Abstract

Background. Certain aspects (frequency and management) of medical emergencies in Norwegian municipalities have not been adequately documented. Previous studies indicate an annual incidence rate of about 10 emergency contacts per 1 000 inhabitants. This article presents results from recording of medical emergencies during two years in the Norwegian municipality Austevoll; an island community (without a mainland connection) south of Bergen, with 4 400 citizens.

Material and methods. Medical emergencies were defined as contacts which the doctor considered necessary to act upon without any delay. Doctors and ambulance personnel recorded data for all such contacts through a questionnaire survey undertaken in Austevoll in the period 1.10.2005–30.9.2007. Many questions were asked about how situations were interpreted, practical work conditions, clinical practice and treatment.

Results. 236 medical emergencies occurred in the study period. This corresponds to an annual incidence rate of 27 per 1 000 inhabitants. 84 % of cases concerned acute disease and 16 % were acute injuries. In 71 % of cases, the emergency occurred in the patient's home or other dwelling. The doctor was the first health professional to reach the patient in 52 % of cases.

Interpretation. This study estimates a higher annual incidence rate for medical emergencies than previous records. A likely reason is that the municipal medical services has been the point of observation in this study, while previous studies have counted emergencies recorded by the EMCCs (Emergency Medical Communication Centres).

Sverre Rørtveit
sverre.rortveit@austevoll.kommune.no
Kommunelegekontoret
5399 Bekkjærsvik

Steinar Hunskaar
Nasjonalt kompetansesenter for legevaktmedisin
og
Seksjon for allmenntilleggsmedisin
Institutt for samfunnsmedisinske fag
Universitetet i Bergen

There is a paucity of data on volume, type and seriousness of medical emergencies outside of hospitals in Norway (1, 2) and there are no national registries or continuous data collection in this field. In the official Norwegian report on professional requirements for emergency medical preparedness (3), the estimated annual incidence rate for medical emergencies (requiring a «red response») was 10 per 1 000 inhabitants, while a study from the National Centre for Emergency Primary Health Care (4) estimated an annual rate of 11 per 1 000 inhabitants in 2006 (2.4 % of contacts to seven out-of-hours medical districts required a red response). It is of great value to gain insight into activities associated with emergency medicine from a population perspective, irrespective of the type of emergency/event and the service level participating. We have therefore investigated the annual incidence rate of medical emergencies in a Norwegian rural district suitable for a complete and systematic data collection.

Material and methods

Austevoll is a Norwegian island municipality south of Bergen (without a mainland connection) with 4 389 inhabitants per 1 January 2007. In the period covered by this study about 3 600 inhabitants could be reached by car within the municipality, while about 800 inhabitants needed transport with an ambulance boat or ferry for medical consultations or care. Ferries or quick boats are used for ordinary transport to the mainland. Four doctors (regular GPs [rGP]) are usually on call in the out-of-hours services; there are two GP offices with normal opening hours and one subsidiary GP office open twice a week. Austevoll has one ambulance car and one ambulance boat and the personnel on the car and boat have 24-hour duties in a central ambulance station. In most cases, ambulance transport to hospital occurs by the ambulance car bringing the pa-

tient to the ambulance boat for further transport to a location on the mainland, where a meeting ambulance car brings the patient to hospital in Bergen. In cases of cardiac arrest and suspected heart attack in some parts of the municipality, lay personnel are taught to use a defibrillator for heart-lung resuscitation and comprise a first responder group (5). Austevoll has a higher proportion of inhabitants in the age group 0–24 years and a lower proportion in the age group 25–89 years than the rest of the country.

Monday–Friday from 8 am to 3 pm the patients normally contact the local GP office, with the exception of instances where the three-digit emergency number 113 is used. Outside normal working hours, patients experiencing an emergency contact one of two call centres; the EMCC (Emergency Medical Communication Centre) in Bergen (via number 113) or the LEMCC (local Emergency Medical Communication Centre). LEMCC is a telephone service that passes patients on to a doctor, sometimes after a consultation with a nurse. In the period 1989–2005, this service was located in a local nursing home and after that in a private nationwide company that offer patients telephone referral to doctors on duty. This company is located in Trondheim, but the telephone number and procedure of referral was the same before and after they moved in 2005. In emergency situations, the doctors and ambulances used the health radio (nationwide radio communication system) in their communication with EMCC and LEMCC. In less urgent situations mobile and regular telephones were used in combination with the health radio. There is no central casualty clinic or out-of-hours service in the municipality. Both in daytime and out-of-hours the doctors in Austevoll handle patient contacts via telephone, con-

Main message

- The annual incidence of acute medical events was 27 per 1 000 inhabitants
- The incidence is about 2.5 times that found in previous studies
- The EMCC reported about one third of these events, other notification bodies reported the rest
- Acute disease was the most frequent event and there were few injuries

sultations in GP offices, home visits or in connection with ambulance calls.

All activity associated with medical emergencies in Austevoll in the period 1.10.2005–0.9.2007 was recorded, with an exception of that for acute psychiatric events and patients giving birth (transport and treatment). A medical emergency was defined as an event for which the doctor, based on the first notification, prioritized to see the patient without any delay. Information was also recorded for events which the doctor initially perceived as less serious than the previous type of event, but for which clinical examination provided information that would have led doctors to go immediately to the patient if the first notification had provided them with similar information (17 patients).

For every medical emergency the doctor and ambulance personnel completed a registration form immediately after the event. The form was available for personnel on a data file and as paper. Forms for doctors consisted of 84 questions and those for ambulance personnel had 29 questions. Questions were asked about patient characteristics, location where the event occurred, use of time in various phases, personnel who participated in handling of the emergency and distribution of work between them, clinical observations, instigated treatment, degree of seriousness/urgency (also called priority grade) upon notification and upon examination, assessment of physical conditions in connection with the call, treatment and transport and assessment of communication and exchange of information.

Upon notification, the doctors assessed the seriousness of the situation on the basis of all available information and background knowledge, irrespective of classifications made by the EMCC operator or others. Doctors classified the events with priority grades as possibly life-threatening (requiring a red response), or as not life-threatening but requiring a doctor on site immediately (yellow response). Corresponding scores were given at patient examination; events were classified as possibly life-threatening, acutely serious but not life-threatening and not serious.

The doctor did not use the system for classifying urgency of situations provided by the Norwegian Index for Medical Emergency Assistance (6). In this index the telephone operator attributes priority grades red, yellow or green according to type of response given to standardized questions at different levels. The index also defines a red response as action to be taken in a life-threatening condition, a yellow response is needed in possibly serious conditions for which vital functions may become threatened and for which a doctor should examine the patient urgently.

When the EMCC classifies the degree of urgency as «red», they send an alarm through the health radio which simultane-

ously alerts doctor, ambulance and sometimes other emergency personnel. The ambulance personnel classified the degree of urgency according to the same scale as the doctor. For the ambulance personnel, the EMCC classified priority grades for events which they were first informed about, while the ambulance personnel themselves classified them from available information in cases where the first information about the event came via the doctor or from other sources.

After collecting all information, the project leader (SR) attributed codes for diagnoses according to the ICPC system (7) and graded the seriousness of the disease or injury according to the NACA-scoring system (National Advisory Committee for Aeronautics) (8). The diagnoses given were either the conditions the doctor suspected or regarded as essential to rule out. According to the NACA system, disease or injury attri-

buted score 3 requires treatment in hospital, but is not life-threatening. Score 0–2 is less serious, scores 4–6 are used for life-threatening and possibly life-threatening situations and score 7 for dead patients.

Completed forms were returned to the project leader by e-mail or ordinary mail. The first author had access to the medical records through his daily work as a doctor in Austevoll municipality.

In cases of incomplete recordings, the project leader collected additional information. The project leader coded information by using SPSS 14.0. The following factors helped obtain complete information: the medical emergency team consisted of few people; the project leader had frequent contact with most doctors and ambulance personnel and frequently mentioned the study to the personnel involved. The project did not encompass change of routines or treatment principles and was thus a quality assu-

Table 1 Disease and diagnosis groups by ICPC codes for 240 patients requiring urgent medical care

Diagnosis group	ICPC-number (n)	N
Cardiovascular disease		
Acute infarction	K75 (23)	23
Angina/chest pain	A11 (2) K74 (15)	17
Acute cardiac failure	K77 (4)	4
Arrhythmias	K76 (2) K79 (6) K80 (2)	10
Cardiac arrest	K84 (6)	6
Respiratory diseases		
Obstructive lung diseases	R78 (2) R95 (3) R96 (6)	11
Other acute respiratory problems	R04 (3) R77 (3) R81 (2) R83 (1) R98 (3) R99 (4)	16
Nervous system		
Stroke/TIA	K89 (3) K90 (21)	24
Cramps	N07 (4) N88 (7) N17 (2)	13
Gastrointestinal diseases		
Acute abdomen/intestinal infection	D01 (14) D73 (2)	16
Gastrointestinal bleeding	D14 (1) D86 (3) D99 (2)	6
General diseases		
Syncope	A06 (14)	14
Intoxications	A84 (2) A86 (4) D80 (1) P15 (1) P16 (7)	15
Acute allergy/anaphylaxis	A85 (1) A92 (6)	7
Other diseases	A78 (2) F93 (1) K93 (2) K99 (2) L84 (1) N89 (1) P74 (3) T87 (2) T89 (1) W99 (1)	16
Sum acute diseases		198
Injuries		
Head injuries	N79 (7) N80 (3)	10
Skin injuries	S18 (6)	6
Multitrauma	A81 (5)	5
Drowning/hypothermia	A88 (3)	3
Other injuries	A80 (1) L73 (2) L75 (1) L76 (3) L81 (3) L95 (1) S16 (2) R87 (1)	14
Sum acute injuries		38
No injury/disease	–31 (3)	3
Confirmed dead	A96 (1)	1
Total sum		240

rance project (confirmed by the Norwegian Social Science Data Services). The project was therefore not reported to the Regional Committee for Medical and Health-Related Research Ethics, but was reported to the Norwegian Data Inspectorate (according to the Health Registry Act).

Results

236 medical emergencies, which met the inclusion criteria, were recorded for 240 patients in the two-year study period. 117 patients were involved in medical emergencies in the first year of the study and 123 in the second year. This corresponds to 27 medical emergencies per 1 000 inhabitants per year. One of the 240 patients was registered six times in the study, two were registered four times, one three times and 12 twice. Three patients were involved in one event and two patients were involved in two events.

The diagnoses are presented in table 1. TIA (transitory ischemic attack) or stroke, heart attack, angina/chest pain, syncope, epileptic cramps and alcohol intoxication were the most common diagnoses. 62 diffe-

rent ICPC codes were used to describe the emergencies in which 240 patients were involved. There were 38 cases of different injuries (16% of all). The sex distribution was 55% men/boys and 45% women/girls and the age distribution was 8% 0–10 years, 9% 11–20 years, 15% 21–40 years, 21% 41–60 years, 26% 61–80 years, 15% 81–90 years and 5% 91 years and older.

Fewer medical emergencies occurred between 11 pm and 8 am than during the rest of the day, with an exception for the period 11 pm–5 am in weekends (tab 2). The medical emergencies occurred in patients' homes or other dwelling in 71% of cases, on roads or in terrain in 11%, in public places in 8%, on a boat or at sea in 4%, in industrial work places or at leisure work in 4%, and in a GP office in 1% of cases.

Upon notification the ambulance personnel classified degrees of urgency as red in 61% and as yellow in 30% of cases, while the doctor classified 33% as red and 60% of cases as yellow. For events notified by others than the EMCC, the ambulance personnel classified cases as requiring a red response in 42% of cases while the doctors

classified 18% of cases in the same way. The health radio (a call or an alarm) was used to notify doctors about most events (tab 3), while the telephone (mobile or stationary) was used to notify the doctors about most events not notified through health radio alarms. The EMCC notified doctors about 86 (36%) events. Priority grades were classified by the doctors as red for 59% of events notified by EMCC, for 14% of those notified by LEMCC, for 20% for notifications directly to the GP offices and for 37% of those notified by other bodies.

The doctor classified the priority grade for 61% of events notified by EMCC (and sent as health radio alarms) as red and 39% as yellow (n = 79). Examples of conditions which were often classified as requiring a higher priority by EMCC than by the doctors are cramps, syncope, croup and acute abdomen.

In medical emergencies, the doctor usually reached the patient before the ambulance (tab 3). Notification by EMCC implied that doctors and ambulances were notified simultaneously, and in these cases they also reached the patient at about the same time. Recorded time from the call to they reached the patient was 14 min (median) for ambulances and 17 min for doctors. The ambulances gave exact recordings as the basis for these data in 66% of cases, while this was done in 19% of cases for the doctors.

Table 4 shows that the age groups 0–10 years and 91 years and older had the lowest proportion of red priority grades (16% and 17%), while the age group 41–60 years had the highest (43%). 31% of women and 35% of men had events given red priority grades and 64% of women and 56% of men had events given yellow grades.

For 26 (11%) events a doctor from the air ambulance came to the patient, for 29 (12%) events two local doctors from Austevoll came. For a total of 49 (21%) events two or more doctors participated. The GPs in the municipality managed 69% of the emergencies, interns handled 14% and locums 17%. The police force were involved in 6% of events, the municipal fire and safety squad in 5% and the first responder group in 3% of events. The doctors recorded that there were problems in connection with certain calls. The most frequent problems were to find the patient (10% of calls) and slippery roads (3%).

After examination by a doctor, 58% of patients were given a NACA score of 3 (hospitalization required, but not life-threatening), 25% were given a lower score (less serious), 13% were considered to be in life-threatening situations (possibly or manifest) and 3% were dead (tab 5). Six patients had a cardiac arrest of probable cardiac cause. Resuscitation was tried for four of these, while two were confirmed dead upon arrival. Two patients had cardiac arrest because of drowning. Of the 31 patients given a

Table 2 Events in the 2-year period by time of day [N [numbers] and rate [events per hour]]. Weekends are Saturdays, Sundays and movable holidays

Time for emergency	Weekdays		Weekend			Total N
	N	Rate	N	Rate	Adjusted weekend rate ¹	
Night 11 pm–5 am	23	3.8	20	3.3	7.3	43
Early morning 5 am–08 am	13	4.3	7	2.3	5.1	20
Morning/noon 8 am–12 am	27	6.8	16	4.0	8.8	43
Mid day 12 am–4 pm	36	9.0	15	3.8	8.4	51
Afternoon 4 pm–7 pm	21	7.0	12	3.0	6.6	33
Evening 7 pm–11 pm	31	7.8	15	3.8	8.4	46
Total	151	6.3	85	3.5	7.8	236

¹ The weekend rate is adjusted with factor 2.2 for difference in numbers of weekdays (502) and weekends (228) in the 2-year period

Table 3 Mode of notification and first personnel group to reach patient by notification body. N = 236 medical emergencies

Mode of notification	Notification body				Total
	LEMCC	EMCC	Telephone to GP office	Other	
Regular telephone	1	0	28	3	32
Mobile telephone	53	6	1	7	67
Health radio	37	1	0	2	40
Health radioalarm	10	79	0	0	89
Other	0	0	1	7	8
Total	101	86	30	19	236
First to reach patient					
Doctor	53	36	23	11	123
Ambulance	25	33	3	4	65
Same time	21	17	4	4	46
Not applicable	2	0	0	0	2
Total	101	86	30	19	236

Table 4 Doctor assessment of priority grade upon notification of emergencies for 240 patients, by age group

Priority grade	Age group (years)							Unknown	Total
	0–10	11–20	21–40	41–60	61–80	81–90	91+		
	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)		
Red	3 (16)	9 (41)	9 (25)	22 (43)	20 (32)	13 (37)	2 (17)	1	79
Yellow	15 (79)	13 (59)	26 (72)	23 (45)	37 (59)	17 (49)	10 (83)	1	142
Green	1 (5)	0 (0)	0 (0)	6 (12)	5 (8)	5 (14)	0 (0)	0	17
Not assessed	0 (0)	0 (0)	1 (3)	0 (0)	1 (2)	0 (0)	0 (0)	0	2
Total	19 (100)	22 (100)	36 (100)	51 (100)	63 (101)	35 (100)	12 (100)	2	240

NACA score 4–6, 11 had acute cardiac conditions, five had serious injuries, four had strokes and 11 had other conditions. 68 % of patients with NACA scores 4–6 were men. 77 % were 41 years and older and 55 % of the events occurred in the period 4 pm–8 am (19 % of them between 11 pm and 8 am).

Discussion

The frequency of medical emergencies in Austevoll was found to be 27 per 1 000 inhabitants per year; most of them occurred in patients' homes. The EMCCs reported a little more than one third of the events and other notification bodies reported the rest. At the time of notification, the doctor classified 33 % of cases to be possibly life threatening (red response) and 59 % of them to be acute, serious and requiring immediate action (yellow response). Acute disease (84 %) was much more common than injuries (16 %), and only 16 % of patients who had a NACA score of 4–6 had injuries.

Cardiac arrest has not been clearly defined. Under this diagnosis we included the two patients with this condition for whom resuscitation was not attempted, but not the two who drowned. The six cardiac arrests in our study correspond to a national incidence of 3 000 cases per year, while the expected annual incidence in Norway is 6–8 000 cases (9). There is a low frequency of this event in our study and a comparison of estimates is not really valid, but the discrepancy indicates that a reliable registry should be established for cardiac arrest in Norway. 32 % of the acute disease cases were stroke and possible cardiac disease, while 13 % of them were cramps and syncope. Prehospital treatment is well standardized for cardio and cerebrovascular crises, but this is not the case for these latter conditions. Pre-specified and standardized procedures are less suitable for them; treatment should rather be tailored more to the individual for those patients. The NACA scoring shows that degree of urgency is generally down-adjusted from the time of notification to the examination. This implies that in the case of a medical emergency, it is equally important to have competence in diagnostics and in synthesising available medical information, as it is to adhere to pre-specified procedures.

More than one 10th of events were reported directly to the GP office while 4/10 were reported to LEMCC. In Austevoll there is a tradition for local reporting, and this causes many medical emergencies to be coordinated locally. In our opinion, it may be an advantage that local teams – when they are sufficiently competent – handle medical emergencies in accordance with knowledge about local conditions.

The fact that the doctor reaches the patient before the ambulance personnel in most cases is a local feature. Reasons are that for events not reported first to EMCC the doctors are notified before the ambulance, and partly that medical services in the municipality are decentralized while the ambulance is centralized. Two local doctors participated in handling of 1/5 of the emergencies, which is desirable in difficult medical emergencies. In situations with potential difficulties regarding transport, communication or treatment, Austevoll municipality emphasizes that an experienced colleague accompanies the intern and locum, and in many cases the experienced doctor advises the inexperienced/unknown over the health radio or mobile telephone.

There was a relatively small variation of the frequency of events over time during the day. The highest incidence of events was after lunch on weekdays and during the evening and in daytime during weekends.

There is a relatively high incidence of emergencies in the nights during weekends. These time-frequency-incidence studies do not provide support for having less personnel on duty at certain times of the day.

The age-group 41–60 years had the highest frequency and proportion of red and yellow response grading at the time of call and the age groups up to 90 years had the second highest for red responses. This probably coincides with the actual frequency distribution of medical emergencies by age. The overweight of yellow responses in the group 91 years and older can be interpreted as the doctors being reluctant to undertake emergency procedures in the oldest patients.

Medical emergencies are defined subjectively in this study; i.e. events that doctors perceive to require immediate action and which they give the highest priority. The alternative would be to use an objective definition, such as that provided by the Norwegian Index for Medical Emergency Assistance (6). The doctor categorized alarms from the EMCCs as red in 61 % of cases and as yellow in 39 %. The index-based assessment of urgency from one of the largest EMCCs in Norway greatly over-estimated the number of life-threatening conditions, as compared to that made by the local doctor in this study.

The Norwegian Index for Medical Emergency Assistance does not provide clear

Table 5 NACA¹ score by doctors' examination. N = 240 patients

NACAscore		N (%)
0	No disease or injury	2 (1)
1	Less serious disease or injury, no treatment needed	30 (13)
2	Less serious disease or injury, treatment needed in or outside of hospital	28 (12)
3	Not a life-threatening injury, requires hospital treatment	140 (58)
4	Potentially life-threatening condition	24 (10)
5	Life-threatening condition	5 (2)
6	Manifest failure of vital functions	2 (1)
7	Dead, also after resuscitation	7 (3)
Not applicable		2 (1)
Total		240 (101)

¹ National Advisory Committee for Aeronautics

instruction on degree of urgency associated with conditions qualifying for a yellow response, and a yellow response is perceived differently in different parts of the primary health services. In this study, a yellow response is interpreted in the narrowest way; i.e. a condition that is so acutely serious that the doctor must immediately lay other things aside and go to the patient. The doctor classified responses as yellow nearly twice as often as red. Earlier studies have not specified which yellow responses reflect real emergency medical conditions (3, 4).

Our approach has provided data that challenge and moderate the impression and pressure of medical urgency, which the EMCC communicates to the primary health services. The study has also enabled recording of almost all medical emergencies in the district assessed, as other sources of reporting (to the highly accessible municipal primary health care services) than the EMCC have also been included. Our method therefore provides a better estimate than that provided if only reports from the EMCC were assessed and if an index-based inclusion criterion had been chosen. Our study estimates the annual incidence rate of medical emergencies to be about 2 1/2 times that found in other studies.

As an island community without a mainland connection, Austevoll has no leak to or influx of emergency cases from other communities, hence we will presume our data to be fairly representative for Norwegian rural communities. Our subjective approach means that experienced and less experienced doctors may assess urgency differently, and comparisons with other studies may be difficult to interpret. But, we do believe that the everyday experience of GPs, on which

the method is based, is a benefit for this study.

Our data indicate that Norwegian regular GPs who are responsible for an average (national) number of patients (normal list length) handle one medical emergency every to every other week – that is if they take on the anticipated out-of-hours duties and are willing to contribute in acute and dangerous situations. However, in many places Norwegian rGPs do not seem to expose themselves to emergency situations to such an extent (10). A report from the Office of the Auditor General in Norway (11) states that the municipal medical emergency services suffer from the fact that physicians do not participate enough in the services, that many of them hand over responsibility for the emergency cases to the ambulance services and emergency wards in hospitals without taking part themselves. In a questionnaire survey among ambulance personnel and doctors working in the out-of-hours services in Troms county, the doctors felt that ambulance personnel were more competent than them in emergency situations, and the ambulance personnel felt more confident about their knowledge of emergency medical procedures than the doctors did about their own knowledge. This tendency should be reversed. The confidence people have to the municipal medical services may depend on how the service functions in critical situations and that doctors take a visible responsibility in emergency situations.

We thank our doctor colleagues and the ambulance personnel in Austevoll for contributing to the data collection.

Disclosed conflicts of interest: None

Literature

1. Nieber T, Hansen EH, Bondevik GT et al. Organisering av legevakt Tidsskr Nor Lægeforen 2007; 127: 335–8.
2. Hansen EH, Hunskaar S. Forskjeller i henvendelse til legevakten Tidsskr Nor Lægeforen 2007; 127: 1344–6.
3. Norges offentlige utredninger. Hvis det haster... Faglige krav til akuttmedisinsk beredskap. NOU 1998; 9.
4. Hansen EH, Hunskaar S. Development, implementation, and pilot study of a sentinel network («The Watchtowers») for monitoring emergency primary health care activity in Norway. BMC Health Serv Res 2008; 8: 62.
5. Rørtveit S, Meland E. Hjertestartargrupper med lekfolk i spredde bygde områder Tidsskr Nor Lægeforen 2004; 124: 320–1.
6. Den norske lægeforening. Norsk indeks for medisinsk nødhjelp. 2. utg. Oslo: Den norske lægeforening, 2005.
7. Brage S, Bentsen BG, Bjerkedal T et al. ICPC as a standard classification in Norway. Fam Pract 1996; 13: 391–6.
8. Tryba M, Brüggemann H, Echtermeyer V. Klassifizierung von Erkrankungen und Verletzungen im Notarztrettungssystem. Notfallmedizin 1980; 6: 725–7.
9. Sunde K, Søreide E, Jacobsen D et al. Terapeutisk hypotermi etter hjertestans redder flere liv! Tidsskr Nor Lægeforen 2004; 124: 925–6.
10. Sandvik H, Zakariassen E, Hunskaar S. Fastlegenes deltakelse i legevakt Tidsskr Nor Lægeforen 2007; 127: 2513–6.
11. Riksrevisjonens undersøkelse av akuttmedisinsk beredskap i spesialisthelsetjenesten. Dokument nr. 3: 9 (2005–2006). Oslo: Riksrevisjonen, 2006. www.riksrevisjonen.no/Revisjonsresultater/Dokumentbase_Dok_3_9_2005_2006.htm (25.4.2008).

The manuscript was received 1.7.2008 and accepted for publication 17.2.2009. The medical editor was Are Breen.